ASSIGNMENT 12

Textbook Assignment: "Earthwork Operations," and "Paving Operations and Equipment," pages 15–37 through 16–44.

Learning Objective: Recognize the techniques of earthwork operations.

12–1. Which of the following is NOT a factor when determining the methods of earthwork operations required for a project?

1. The acreage to be cleared
2. The availability of water to achieve optimum moisture content
3. The type and density of vegetation
4. The expected weather conditions

12-2. Equipment production rates are obtained from which of the following NAVFAC publications?

1. P-300
2. P-306
3. P–404
4. P-405

12-3. What term is used to describe a construction operation that consists of cleaning a designated area of trees, timber, brush, and rubbish?

1. Clearing
2. Grubbing
3. Stripping
4. Grading

12–4. What term is used to describe a construction operation that consists of removing and disposing of objectionable topsoil and sod?

1. Clearing
2. Grubbing
3. Stripping
4. Grading

12-5. What factor(s) must be considered when designing and building a road?

1. Type of drainage
2. Type of soil
3. Amount of clearing and grubbing
4. All of the above

12-6. Optimum moisture content must be maintained when compacting lifts of base course materials.

1. True
2. False

Learning Objective: Recognize the principles of pavement construction.

12-7. What was the primary reason for the rapid growth in the construction of asphalt road surfaces in the late 1800s?

1. The need for large airport runways
2. The cost of asphalt was cheaper than concrete
3. The emerging automotive industry
4. Asphalt was the only means available for hard-surface paving

12-8. A pavement is only as good as the materials and workmanship that goes into it.

1. True
2. False

12-9. Both rigid and flexible paving consist of which of the following materials?

1. Sand and gravel
2. Crushed stone
3. Binder
4. All of the above

12–10. In addition to the asphalt content, what other factor determines the principal characteristics of asphalt -paving mixes?

1. The total weight of both the asphalt content and aggregates
2. The relative amount of aggregates
3. The largest size aggregate used
4. The type of roadbed the asphalt is used on

12–11. Asphalts are produced from refineries in many types and grades. The one known as asphalt cement is the basic material used in asphalt paving and is produced in which of the following conditions?

1. Hard
2. Brittle
3. Semisolid
4. Water thin

12–12. Which of the following properties is essential for an asphalt-wearing surface?

1. Retention of antiskid properties
2. Resistant to wear
3. The capability to shed surface water
4. All of the above

12–13. What term is used to describe the operation of adding more layers of asphalt to a pavement to increase its weight-bearing surface?

1. Surface treatment
2. Asphalt addition
3. Stage construction
4. Subgrade elevation

12-14. A load-bearing test commonly used by the Seabees is the CBR test. What does CBR represent?

1. Course base repair
2. California bearing ratio
3. California base rate
4. Cold-bearing rate

Learning Objective: Recognize the principles of preparing asphalt for construction operations.

12-15. Asphalt cement can be made temporarily fluid (liquefied) for construction operation in what three ways?

1. Emulsifying with water, melting, and crushing
2. Melting, dissolving, and crushing
3. Heating, dissolving, and emulsifying
4. Crushing, heating, and dissolving

12-16. The aggregate and binder of a hot-mix paving mixture should be heated to what temperature, in degrees Fahrenheit?

1. 110°F
2. 200°F
3. 310°F
4. 400°F

12-17. Blue smoke rising from the spreader hopper is often an indication of which of the following asphalt conditions?

1. The mix is overheated
2. The mix is too cold
3. The mix is too rich
4. The mix is too lean

12-18. What functions does a prime coat of bituminous material serve?

1. The prime coat penetrates the base course about 2 inches, fills most of the voids, and promotes adhesion between the base and previous bituminous applications
2. The prime coat penetrates the base course about 1/4 inch, fills most of the voids, promotes adhesion between the base and bituminous applications placed on top of it, and waterproofs the base
3. The prime coat waterproofs the wearing surface and controls dust and loose aggregates
4. The prime coat increases compaction and binds the aggregates and fines together

12–19. An underprimed area can be corrected by performing which of the following operations?

1. Applying twice the amount of prime material
2. Applying a layer of sand, then repriming over it
3. Applying twice the thickness of asphalt over the underpriced area
4. Applying a second coating of the prime material

12–20. What is an indication that the base course is overpriced?

1. A free film of prime material remains on the base after a 45–hour curing period
2. The area looks dry and dark after a 24–hour curing period
3. A free film of prime material remains on the base after an 8–hour curing period
4. The area looks and feels damp after a 12–hour curing period

12-21. A tack coat is an application of asphalt to an existing paved surface that provides a bond between which of the following surfaces?

1. The subsurface and subgrade surface
2. The finish surface and the subgrade surface
3. The existing surface and the asphalt material to be placed on it
4. The subsurface and the base surface course

12–22. An area that has an excess of tack coat material can be corrected by taking which of the following actions?

1. Apply heat until the excess bitumen drys
2. Spread clean, dry sand on the area
3. Skip over the area and pave it last
4. Dig up the area and replace the material

Learning Objective: Recognize the types of asphalt pavement construction.

12-23. What is the major difference between plant-mix construction asphalt and mix–in–place construction asphalt?

1. The type of asphalt and aggregate used in plant-mix construction is much heavier and stronger than that used in mix–in–place construction asphalt
2. Plant-mix construction asphalt requires a different rolling technique
3. Plant-mix construction asphalt is prepared in a central mixing plant
4. Plant-mix construction asphalt requires a different curing time

12-24. When computing plant-mix materials, you use what pound value to represent the approximate weight of 1 cubic foot of compacted hot-mix asphalt?

1. 80 pounds
2. 100 pounds
3. 120 pounds
4. 146 pounds

12-25. When you are performing asphalt hand spreading operations, what problem can result if you throw the material a long distance or dump it from too great a height?

1. The hot-mix will cool too fast
2. The hot-mix will splatter all over the place
3. The hot-mix will segregate
4. The hot-mix will fail to bind with the mix placed on the ground

12-26. What is the most important phase of flexible pavement construction?

1. Compaction
2. Mixing
3. Paving
4. Transporting

12-27. What is an advantage of mixed-in–place construction?

1. It takes less time and skill to work with
2. It retains a higher road-bearing ratio
3. The aggregate is already on the roadbed or available from nearby source
4. The asphalt is less expensive and can be laid in cold weather

12-28. A single layer of road-mix pavement normally has what thickness, in inches?

1. 1/2 to 1
2. 1 to 1 1/2
3. 1 1/2 to 3
4. 3 1/2 to 4 1/2

12–29. “Surface moisture” is defined as

1. the depth of puddling water
2. the film of water around each particle of stone or sand
3. the estimated number of gallons of water a road surface can hold
4. the amount of moisture that collects on a road surface during early morning hours

12–30. A uniform mix controls the rate of travel and mixing operation of a travel mix plant.

1. True
2. False

12-31. When performing blade–mixing operations, you should apply what total number of equal applications of bitumen with a bituminous distributor?

1. Two
2. Three
3. Four
4. Five

12–32. The bituminous mix should be spread when the surface is damp or when the mix itself contains an excessive amount of moisture.

1. True
2. False

Learning Objective: Recognize the defects and techniques of repairing flexible pavements.

12–33. Which of the following types of surface cracks is caused by excessive movement of the surface over unstable subgrades or base courses?

1. Alligator
2. Edge
3. Reflection
4. Slippage

12–34. Which of the following types of surface cracks is caused by a lack of bond between the surface layer and the course beneath?

1. Alligator
2. Edge
3. Reflection
4. Slippage

12–35. What type of surface defect results from either compaction or a movement of the subgrade soil that weakens the subgrade?

1. Cracking
2. Distortion
3. Disintegration
4. Melting

12-36. What type of surface defect results from the localized upward displacement of the pavement caused by swelling of the subgrade?

1. Channeling
2. Corrugation
3. Depression
4. Upheaval

12–37. Which of the following types of surface defects is usually the result of a rich plant mix or a prime or tack coat that was placed too heavy?

1. Polished aggregates
2. Raveling aggregates
3. Bleeding aggregates
4. Rolling aggregates

12-38. Repairs performed on flexible pavements must start at the source of the failure.

1. True
2. False

12–39. When you are performing pavement-cutting operations for patchwork, the cut should extend to at least what depth in the good pavement?

1. 1 foot
2. 2 foot
3. 3 foot
4. 4 foot

12–40. When placing a hot mix in a patch, you should overfill the area by approximately what percentage over the required pavement thickness?

1. 10%
2. 20%
3. 30%
4. 40%

Learning Objective: Recognize the principles of surface treatment.

12–41. Of the following improvements, which is gained by applying a surface treatment?

1. It waterproofs the surface
2. It provides a wearing surface
3. It prevents hydroplaning
4. All of the above

12–42. What is the liquid asphalt rate of application (ROA) when performing dust–laying operations?

1. 0.1 to 0.5 per square yard
2. 0.1 to 0.5 per square feet
3. 0.1 to 0.5 per cubic feet
4. 0.1 to 0.5 per cubic yards

12–43. When performing single-surface treatment operations, you should push the aggregate into the bituminous material using what type of roller?

1. A towed grid
2. A vibratory steel drum
3. A pneumatic–tired
4. A vibratory sheepsfoot

12–44. When performing single–surface treatment operations, you should ensure aggregates cover the bituminous material within how many minutes after spraying?

1 1 minute
2. 10 minutes
3. 30 minutes
4. 60 minutes

12-45. To compute the amount of aggregate per square yard required for a single-surface treatment, you use what rule of thumb?

1. 10 to 15 pounds per square yard
2. 15 to 25 pounds per square yard
3. 25 to 30 pounds per square yard
4. 30 to 35 pounds per square yard

12–46. What size of aggregate is used on the second layer of a multiple-surface treatment?

1. 1/2 the size of the previous layer
2. 3/4 the size of the previous layer
3. 1 1/2 the size of the previous layer
4. 1 3/4 the size of the previous layer

Learning Objective: Recognize the principles and components of paving equipment.

12-47. Of the following disadvantages, which is associated with the use of a tailgate spreader?

1. The truck must be operated in reverse
2. A reduction in steering control of the truck
3. A reduction in the operational speed of the truck
4. All of the above

12-48. Which of the following components is NOT part of an asphalt distributor unit?

1. Insulated storage and heating tank
2. Open-flame heating system and asphalt pump
3. Low-pressure air blower and circulating and spraying system
4. Twin-shaft pugmill that thoroughly mixes the material

12-49. Asphalt heating operations can be performed while the distributor truck is traveling to the jobsite.

1. True
2. False

12-50. When spraying bitumen with a distributor truck, the application rate is controlled by the length of the spray bar, the pump output, and what other factor?

1. Amount of material carried
2. Existing ground material
3. Forward speed of the distributor truck
4. Amount of turns on the main control valve

12-51. When operating a distributor truck, the spray bar should be set high enough for the road surface to receive triple coverage. However, under heavy wind conditions or depending on the nozzle spacing, it may be necessary to lower the spray bar more to ensure the surface receives which of the following coverages?

1. Single
2. Double
3. Triple
4. Half

12-52. When heating bitumen in a distributor truck, you should NOT use which of the following fuels?

1. Kerosene
2. Fuel oil
3. Diesel
4. Gasoline

12-53. Before the burners are lit on a distributor truck, the flues must be covered by a total of how many inches of material?

1. 3 inches
2. 6 inches
3. 9 inches
4. 12 inches

12–54. Which of the following actions should you take to prevent the distributor pump and circulation system from clogging up because of bitumen setting up and hardening in the system?

1. When used, you should flush out the pump and circulating system at the end of the day
2. Flush out the pump and circulating system at least once a week
3. Wash the outside of the pump with solvent weekly
4. Circulate bitumen through the pump daily

12–55. What is the storage capacity of an asphalt kettle?

1. 15 gallons
2. 50 gallons
3. 100 gallons
4. 165 gallons

12–56. Which of the following conditions can develop if emulsified asphalt is left in a distributor truck for any great length of time?

1. The emulsified asphalt can become highly flammable
2. The emulsified asphalt will separate and set in much less time than cutbacks
3. The emulsified asphalt will expand and damage the tank
4. The emulsified asphalt will evaporate resulting in the loss of material

12–57. To prevent sticking, you must take what action to prepare the bed of a dump truck before loading hot–mix asphalt into it?

1. Spray the bed with water
2. Lay a light coat of sand in the bed
3. Coat the bed with a release agent (lubricant)
4. Lay a plastic covering in the bed

12–58. Which of the following factors should be considered when planning the number of trucks required for an asphalt plant?

1. The mix production rate of the plant
2. The length of the haul
3. The type of traffic encountered
4. All of the above

12-59. An end–dump truck must be inspected to ensure the rear of the dump bed overhangs the rear wheels enough to discharge the hot-mix asphalt into the paver hopper. If the dump bed does not, what action should you take?

1. Do not use the truck
2. Shovel the material by hand into the hopper
3. Add an apron with side plates to increase the overhang of the dump bed
4. Raise the dump bed only halfway

12-60. When positioning a dump truck to dump a hot-mix asphalt into a paver, you must ensure the truck is squarely against the paver and the truck tires are in what position in relation to the roller bar on the paver?

1. A few inches away
2. Squarely against the roller
3. At least 1 foot away
4. Bumped against the roller bar

Learning Objective: Recognize the principles of asphalt finishers (pavers).

12–61. The primary job of an asphalt paver is receiving and spreading asphalt in a predetermined uniform length, width, thickness, and shape.

1. True
2. False

12-62. Hot-mix asphalt that is dumped in the hopper is transported to the distributing augers in what way?

1. It is carried by the vibrating screed
2. It is pushed by the tamper bar
3. It is pushed by the bevel end plates
4. It is carried by the feed conveyor

12–63. During paver operations, which of the following conditions can cause unnecessary movement of the paver that is transmitted to the screed and results in an uneven pavement surface?

1. Low tire pressure or loose crawler tracks
2. The screed is too hot
3. The vibratory unit is not set properly
4. Oversteering by the operator

12-64. A paver engine is not working properly and a power lag occurs that causes a temporary failure of the vibrators or tamping bars in the screed unit. What condition results from this failure?

1. A stretch of pavement that is less dense or contains slightly less material
2. A stretch of pavement that has more material
3. The fines in the asphalt mix separate
4. The asphalt mat is higher in that area after it is rolled

12–65. During operations, the speed of the conveyor and the opening of the control gates at the back of the hopper of the paver should be adjusted to allow just enough mixture to be delivered to the augers so they are operating what minimum percentage of the time?

1. 65%
2. 75%
3. 85%
4. 95%

12-66. What component of the asphalt paver irons the asphalt mixture surface, leaving the hot mat thickness at a depth that conforms with job specifications?

1. The screed
2. The tamper
3. The conveyor
4. The hopper

12-67. Tamping bars and vibratory mechanisms are designed to perform which of the following functions?

1. Strike off and heat the asphalt
2. Strike off and adjust the amount of asphalt
3. Strike off and compact the asphalt
4. Strike off and roll the asphalt

12-68. What condition results if the tamping bar travels too far downward below the screed plate on a tamping bar type of screed?

1. The hot-mix builds asphalt upon the screed face and this condition tends to scuff the surface of the mat
2. The hot-mix asphalt decreases in thickness and the surface pits
3. Overcompaction occurs resulting in too thin of a mat
4. The tamper over compacts, crushing the aggregate and causing the mat to break apart

12–69. On a vibrating type of screed, the compactive force can be generated by hydraulic motors, rotating shafts with eccentric weights, or by electric vibrators.

1. True
2. False

12-70. When an adjustment is made to the screed control of a paver, the effect of the adjustment can be seen after the paver travels what distance?

1. Several yards
2. Several inches
3. Several feet
4. Several meters

12-71. Poor pavement smoothness is most likely a result of which of the following operator errors?

1. Paving too fast
2. Over thickness control
3. Paving too slow
4. Overcompaction

12-72. The screed plates on an asphalt paver have a total of how many screed crown adjustments?

1. One
2. Two
3. Three
4. Four

12–73. For paving operations, a paver screed should be heated at what time ?

1. During the paving operation
2. Before the paving operation
3. Only sometimes during the paving operations
4. Only when asphalt materials are under the screed

12–74. Which of the following components are commonly used screed accessory attachments?

1. Screed extensions
2. Cutoff shoes
3. Bevel end plates
4. All of the above

12-75. The required tonnage of hot-mix asphalt for a project is 1500 tons. The screed of the paver is set at 8 feet, and the depth of asphalt is 4 inches. What is the amount of asphalt that can be laid per hour?

1. 80.46 tons
2. 100.62 tons
3. 128.35 tons
4. 192.72 tons

☆ U.S. GOVERNMENT PRINTING OFFICE: 1994 — 633-130/20008